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Lockdown and beyond: Learning in a changing landscape

Technology and student motivation during the COVID-19 pandemic and beyond.

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Executive Summary

The COVID-19 pandemic has led to unprecedented change in the UK, US and Australian education systems.

This paper shows how lockdowns in each country have created a range of new challenges for educators, but also deepened existing long-term problems and inequalities in education systems. Teachers, parents and students have quickly turned to digital solutions to manage the impact of this fast-moving crisis.

The use of education technology presents huge opportunities for effective teaching and learning, both inside and outside the classroom. This new analysis of the evidence suggests that, as educators increasingly look to technology to support their practice, they should prioritise solutions that drive student motivation.

There are three reasons for this: First, there is a strong research base linking motivation and attainment. Second, student motivation has been adversely affected by lockdowns. Third, student motivation will continue to be an issue for schools long after the pandemic ends.

Finally, there is an increasingly sophisticated and clear body of evidence showing how well digital solutions might improve student motivation and as a result academic attainment. Educators in the UK, US and Australia should use this when selecting tools and programmes to help their students.

Contents

This paper makes this argument in two parts:

Throughout this paper, we will draw on evidence from the US, Australia and the United Kingdom. We have identified common findings across all three regions and compared findings between countries where appropriate.

Finally, we have presented a detailed methodology to show how this paper has been compiled, p/34. Our approach draws on both original longitudinal research conducted by ImpactEd in the UK, and an analysis of existing datasets on COVID-19 impacts and student motivation globally.

The COVID-19 pandemic has caused widespread educational disruption. A record number of young people have not physically attended school for an extended period of time, with serious social, emotional and learning consequences. It is also clear that disruption to in person learning will continue for some time to come.
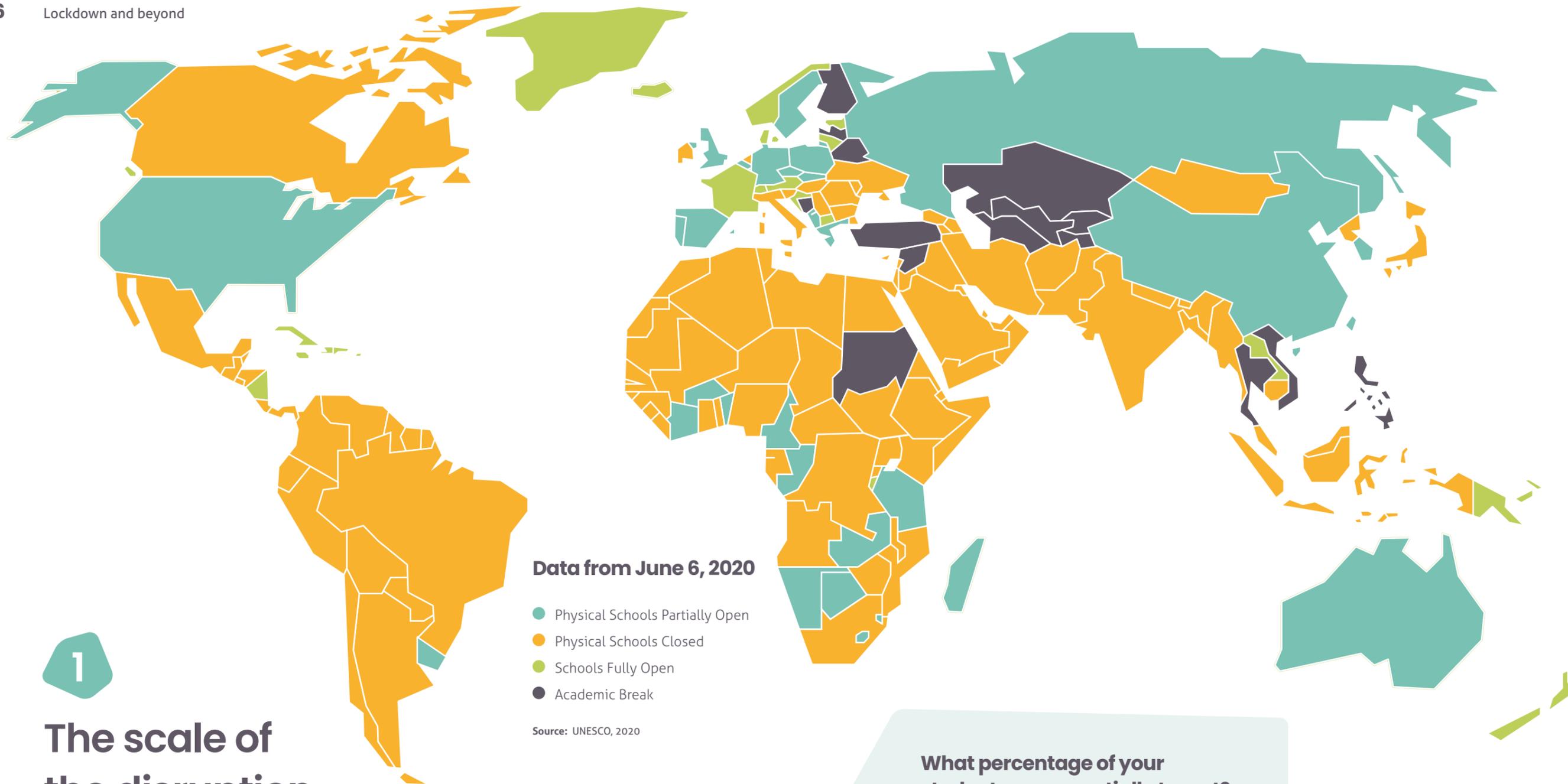
In many cases this disruption has highlighted the extent of existing inequalities rather than introducing entirely new challenges. This means that education leaders are trying to tackle immediate needs and more systemic challenges at the same time. Solutions that help them do both are in short supply.

Understandably, educators and policy makers have turned to technology, and in particular edtech solutions, to ensure effective learning can continue in a blended or remote environment. In this rapid adoption of edtech, it is important that educators focus on to platforms and products that have a strong evidence base and address long-term as well as short-term challenges, in particular those that drive student motivation. Technology that prioritises and drives student motivation is a good choice.

In the first section we explore the evidence for the challenge of student motivation and how technology can address this.

Section 1
The disruption caused by COVID-19 and how motivation emerges as a primary challenge for educators

In section 1 we will explore the following themes:

1	The scale of the disruption
2	Mass learning loss
3	A fast-changing digital landscape
4	Motivation as the primary challenge
5	The link between wellbeing and student motivation
6	Helping teachers to help students

Data from June 6, 2020

- ● Physical Schools Partially Open
- ● Physical Schools Closed
- ● Schools Fully Open
- ● Academic Break

Source: UNESCO, 2020

1

The scale of the disruption

Over 1.2 billion learners have been affected.

At the end of April 2020, the COVID-19 pandemic had forced the shut-down of educational institutions in 181 countries affecting 73.5% of enrolled learners (UNESCO, 2020).

International evidence suggests that engagement with remote and online learning has been inconsistent at best. In the US, 25% of students were reported as truant during the coronavirus closure, not making contact with teachers in any way (EdWeek Research Center, 2020). Only 35% of Australian teachers were confident their students were learning well in remote learning (Grattan Institute, 2020). And in the UK, on average children spent only 2.5 hours each day doing either offline or online school work (ONS, 2020).

74%

of all students have been affected by lockdowns

What percentage of your students are essentially truant?

- 25%
- 75%
- ● Not Truant
- ● Truant

April 23, 2020
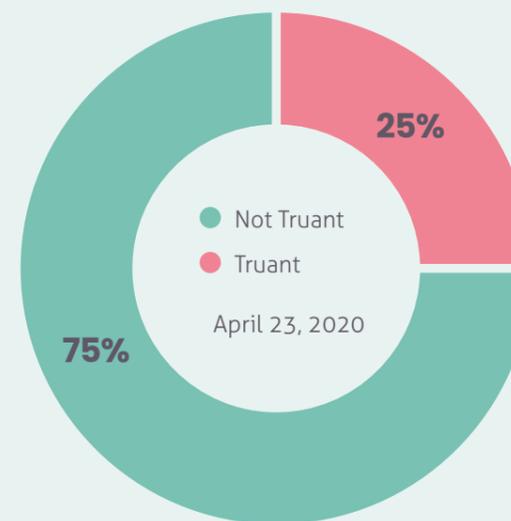
Source: EdWeek Research Centre, 2020.

2

Mass learning loss

With average losses of 0.6 years of schooling, we can expect to see a widening of existing achievement gaps. In the US this has been estimated as between 15% and 20%.

The consequence of this scale of disruption is significant learning losses. Globally, COVID-19 could result in a loss of 0.6 years of schooling, bringing down the effective years of basic schooling that students receive from 7.9 years to 7.3 years (Azvedo et al, 2020).

For every day students are not at school, existing inequities are compounded at a faster rate"

JULIE SONNEMANN AND PETER GOSS, COVID catch-up helping disadvantaged students close the equity gap. Grattan Institute, Australia. June 2020

Learning Decay in the UK: Increasing Inequalities

In the UK, children from better-off families are spending 30% more time on home learning than are those from poorer families.

From a survey of over 4,000 respondents from parents of children aged 4-15, 28 April - 12 May 2020

Source: Institute for Fiscal Studies, 2020.

While we know that in all scenarios student learning will suffer a setback, those losses will be greatest among low-income students where we already see achievement gaps. Addressing losses, especially for vulnerable students, and ensuring disparities are not made larger is an urgent challenge for education leaders.

In the US, one projection suggested that students will end the abbreviated 2019-20 school year with only 63-68% of the learning gains in reading relative to a typical school year. In mathematics, this is projected to be even smaller, with students ending the year with 37-50% of the average gains in a normal school year. For students moving from fifth to sixth grade, the same projection suggested students would end the school year with only 19% of total mathematics gains (Kuhfeld et al., 2020).

Research suggests that the impact of this learning loss may be long-term. For example, **K–12 students in the US could lose $61,000 to $82,000 in lifetime earnings** (in constant 2020 dollars), or the equivalent of a year of full-time work, solely as a result of COVID-19–related learning losses.

These costs are worse for Black and Hispanic Americans. While White students are estimated to earn $1,348 a year less (a 1.6% reduction) over a 40-year working life, the figure is $2,186 a year (a 3.3% reduction) for Black students and $1,809 (3%) for Hispanic ones (Dorn et al., 2020).

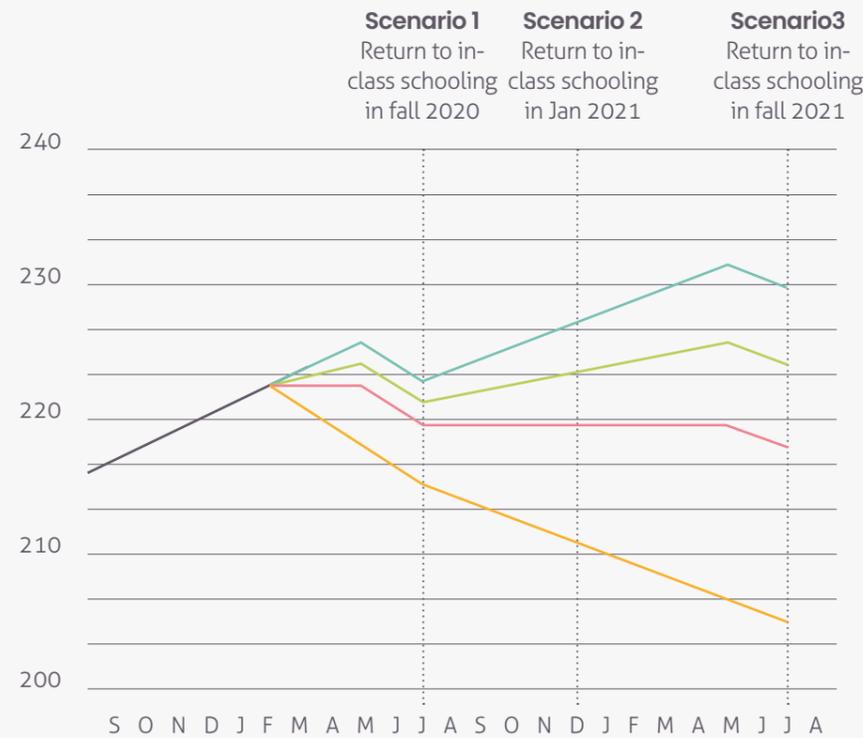### The likely impact of COVID–19 on education

The European Commission's science and knowledge service, Joint Research Centre, suggest four main conclusions on the possible impact of COVID-19 on education

1 Student learning is expected, on average, to suffer a setback;

2 Effect on achievement is likely to vary according to socio-economic status;

3 Inequalities in socio-emotional skills may also increase;

4 Widening social gap in both cognitive and socio-emotional skills caused by COVID-19 may have long-term implications

Source: Di Petro et al, 2020.

Education losses caused by COVID-19 could hurt long-term GDP growth

Scenario 1
Return to in-class schooling in fall 2020

Scenario 2
Return to in-class schooling in Jan 2021

Scenario 3
Return to in-class schooling in fall 2021

S O N D J F M A M J J A S O N D J F M A M J J A

Typical in-person
Students learn at typical rate with in-classroom instruction[2]

Learning slowdown - average remote learning
Students learn at typical rates until March 2020, followed by ~52% of learning through remote instruction[3]

Learning slowdown - low quality remote learning
Students learn at typical rates until March 2020, followed by no growth or loss resulting from low quality remote instruction[4]

Learning slowdown - no instruction
Students lose learning equivalent to an extended summer slide, as a result of no instruction or disengagement from remote learning

Source: Dorn, 2020.

Learning, Ethnicity and Earnings in the US

Average annualised earnings loss, scenario 2, $billion

● Dropout
● Learning Loss
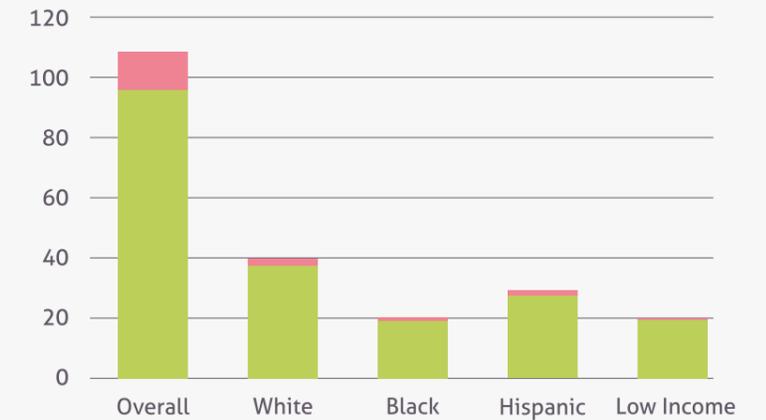
Estimated effect of learning loss	Overall	White	Black	Hispanic	Low Income
Numbers of students affected	55.3	27.1	8.3	14.3	11.8
Average annual earnings loss ($)	1,785	1,348	2,186	1,809	1,642
Average lifetime earnings lost (%)	2.2	1.6	3.3	3.0	4.0
Estimated effect of higher number of dropouts					
Average number of high-school dropouts, thousand	648	263	114	233	n/a
Average annual earnings lost ($[2])	17,218	10,951	11,879	9,280	n/a
Average lifetime earnings lost (%[1])	21.2	13.2	18.1	15.2	n/a

Source: Dorn et al., 2020.

Education losses caused by COVID-19 could hurt long-term GDP growth

Estimated impact, by scenario

	Learning loss, months	Number of additional high-school drop-outs, thousand	GDP loss by 2040 $ billion	Annual earning loss $ billion
Scenario 1 In-classroom instruction[1] resumes by fall 2020	3.1	232	80–125	44–57
Scenario 2 In-classroom instruction[1] resumes by Jan 2021	6.8	648	173–271	96–124
Scenario 3 In-classroom instruction[1] resumes by fall 2021	12.4	1,100	306–483	169–221

[1]Or instruction as effective as in-classroom instruction

> **Online learning has existed for a long time, but it has never been pushed this hard before"**
>
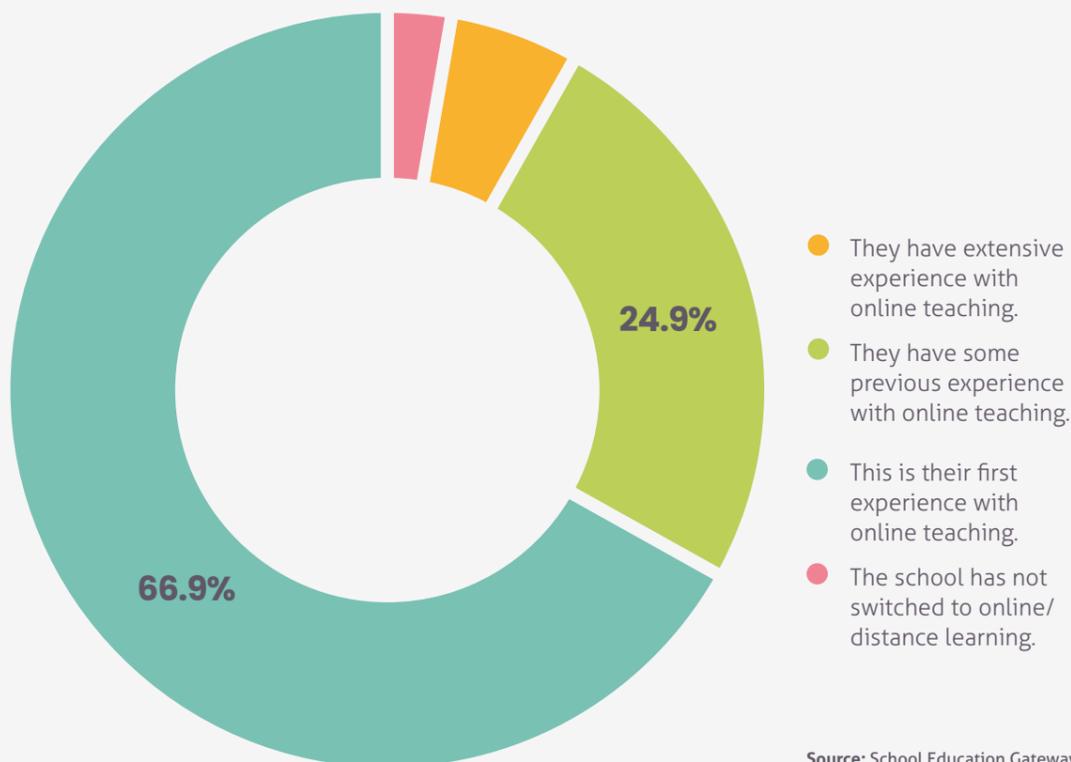> **PROFESSOR FANG CHEN,**
> University of Technology Sydney

3

The rapid move to online teaching at scale

During the first wave of the pandemic, educators turned to edtech to support their practice in record numbers, accelerating the digitisation of learning that was already on the rise before COVID-19.

"A Sudden Switch"
In April and May, 67% of teachers in Europe taught online for the first time

24.9%

66.9%

- They have extensive experience with online teaching.
- They have some previous experience with online teaching.
- This is their first experience with online teaching.
- The school has not switched to online/ distance learning.

Source: School Education Gateway, 2020.

The 'Zoom Boom' in Education
Downloads of education edtech tools in the three regions surged by an average of 158% in March 2020.

Source: Sydow, 2020.

Australia saw the greatest surge in the use of edtech tools with an 190% increase. In the US, some specific edtech tools saw even greater growth. Google Classroom, Remind: Safe Classroom Communication and ClassDojo (the three most popular education edtech tools), saw 580%, 290% and 565% growth in March respectively versus the weekly average in January 2020 (Sydow, 2020).

In the UK, nearly two-thirds (65%) of teachers and senior leaders say they are more confident using edtech compared to pre-COVID-19. This is positive as three-quarters (75%) believe online remote or blended learning will play a continued role in education after lockdown ends. Two thirds of teachers will change how they use technology in the classroom (TeacherTapp, 2020).

Whilst it is clear that technology is the answer to providing learning in a blended or remote environment, not all solutions are equal and quality edtech products will be both knowledge driven and provide enhanced engagement and feedback for students. This initial rapid rush has enabled educators to identify what elements of solutions are most important in improving outcomes.

Growth in EdTech tools Downloads
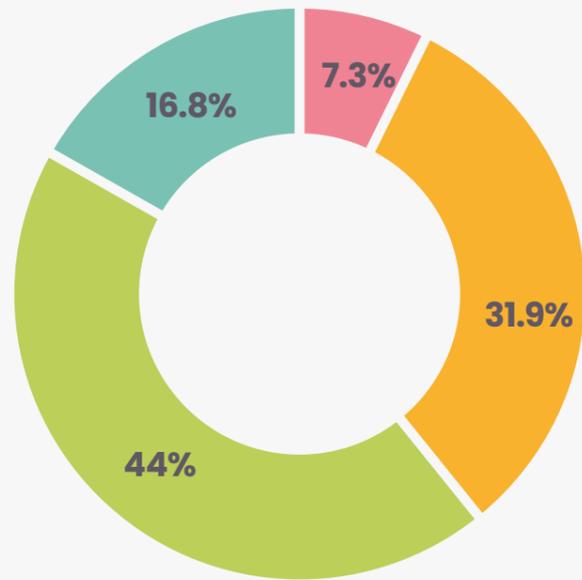In March, edtech downloads worldwide surged 90% compared to the weekly average in the fourth quarter of 2019.

Source: Sydow, 2020.

"The future of learning?"
In your opinion, due to the current circumstances created by the COVID-19 virus, when schools fully reopen, will online/distance teaching remain part of school practice?

- School will be different online teaching will become integral to school practices
- School will be a little different, with more online learning than before
- The school will return to its original practice with minor changes
- The school will return to its original practice

Source: School Education Gateway, 2020.

The World Bank on Edtech
"Little research attention has been paid to documenting and analysing attempts of education systems moving quickly and at scale to provide online learning when all or many schools are closed. Related 'good practices' are considered rare, and on the whole, activities and initiatives of these sorts are poorly documented".
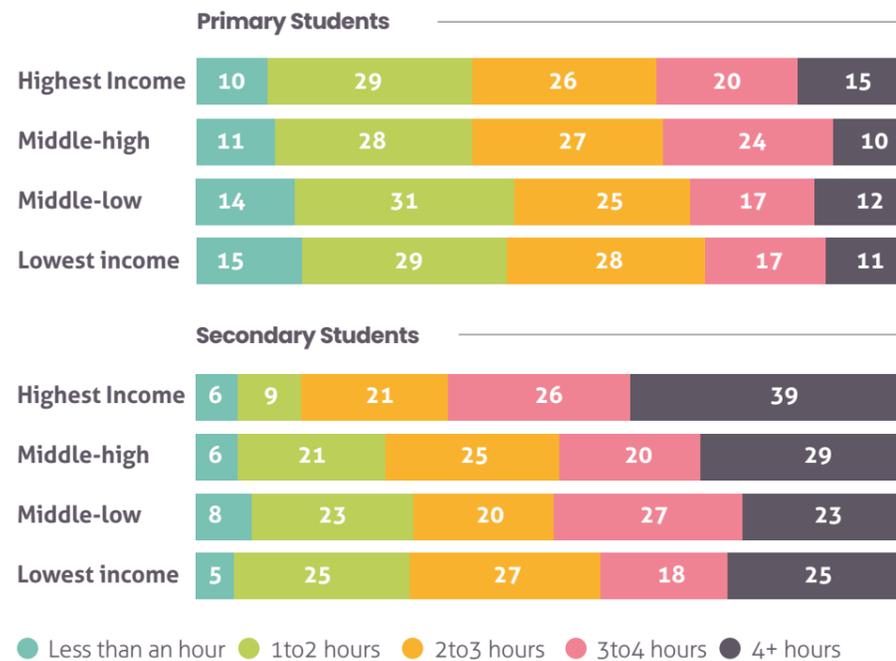
Source: World Bank, 2020.

Immediate challenges for schools have included supporting young people with no access to digital devices and helping teachers to utilise new technology efficiently and effectively. As the graph opposite shows, students who come from low-income families tend to spend less time on remote learning than their wealthier peers. This is a challenge that will need to be overcome as a majority of teachers think that remote learning will remain part of schooling, even when schools fully reopen.

Moving forward, efforts to ensure different online tools work together in a single digital ecosystem with a clear focus on how they support student learning will be a priority as schools modify their digital learning strategies.

Our recommendation is that strategies for the use of digital technology focus as a priority on its links to the factors we know will influence the quality of student learning – namely, student motivation, student wellbeing and teacher workload.

Income and Remote Learning in the UK

Primary Students

	Less than an hour	1to2 hours	2to3 hours	3to4 hours	4+ hours
Highest Income	10	29	26	20	15
Middle-high	11	28	27	24	10
Middle-low	14	31	25	17	12
Lowest income	15	29	28	17	11

Secondary Students

	Less than an hour	1to2 hours	2to3 hours	3to4 hours	4+ hours
Highest Income	6	9	21	26	39
Middle-high	6	21	25	20	29
Middle-low	8	23	20	27	23
Lowest income	5	25	27	18	25

- Less than an hour
- 1to2 hours
- 2to3 hours
- 3to4 hours
- 4+ hours

Source: UKHLS COVID-19 Survey, 2020.

" I don't think that the local school building is going away. But I think people have been awoken to the idea that 'going to school' doesn't mean I must be dropped off at this physical space Monday through Friday. Here's an opportunity to rethink how and when learning takes place"

BRUCE FRIEND, Chief Operating Officer, Aurora Institute

4 Motivation as the primary challenge

The research shows that student motivation is one of the biggest concerns for teachers, and that it is central for improving attainment. In many cases, the move to remote learning seems to have made matters worse.

'The motivation challenge'

43%
Of teachers chose keeping students motivated and engaged as the biggest challenge related to supporting students.

Source: School Education Gateway, 2020.

61%
Of students say their morale is lower (March 2020).

By June, that number reached
71%

Source: EdWeek Research Center, 2020.

Across all the student and parent facing surveys reviewed for this paper, 'boredom' was listed as a concern for at least 50% of participants.[1] In one survey in Canada, 71% of students described themselves as bored (Angus Reid Institute, 2020). This has significant knock-on consequences for student engagement and educational attainment.

In Australia and New Zealand, 80% of teachers believed that students would need extra additional support when returning back to the physical classroom. In Canada, 60% of children "attending" school online described themselves as unmotivated.

ImpactEd's Research: Motivation and the Lockdown in the UK

ImpactEd's unique longitudinal research in the UK, where students have been surveyed every two weeks, shows that during lockdown only 34% of students reported active interest in their home learning, with the majority being neutral or actively disinterested.

Students from disadvantaged backgrounds have reported lower levels of persistence than their peers in every two weeks since the beginning of May.

Source: ImpactEd, 2020.

Overall, how interested in your school work do you feel while at home?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

10%	18%	38%	28%	6%

- Not at all interested
- Not very interested
- Neutral
- Somewhat interested
- Very interested

[1]See, for example, the Save the Children Survey in the US (April) where 52% of children said they were bored (sample size: 1500) and the Barnardos survey in the UK where 51% of children said they were bored (sample size: 4200).
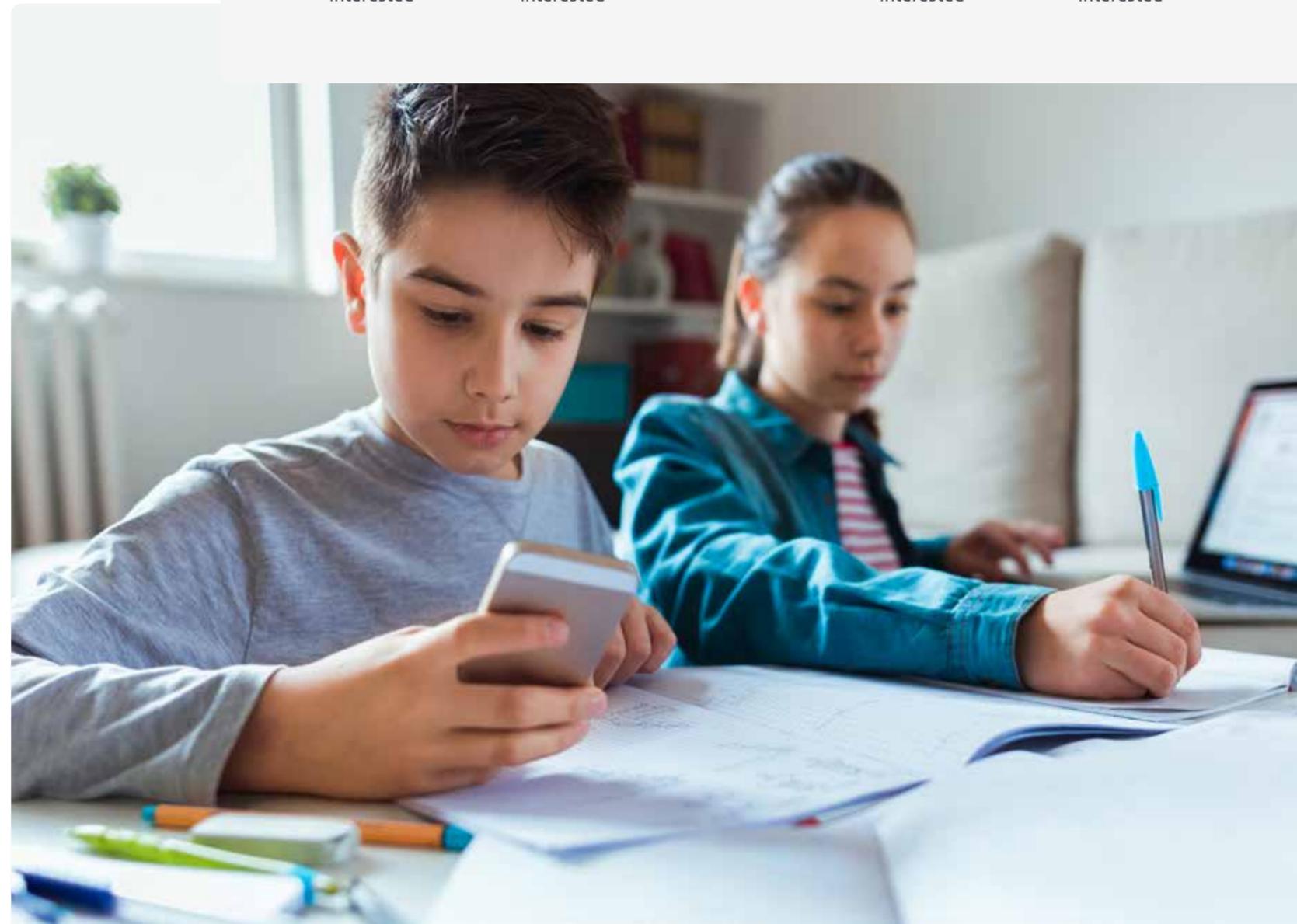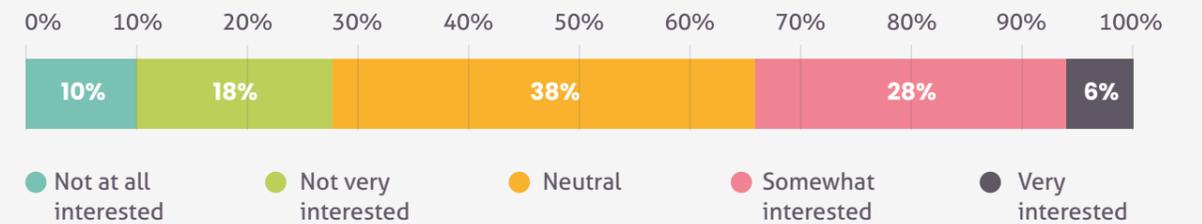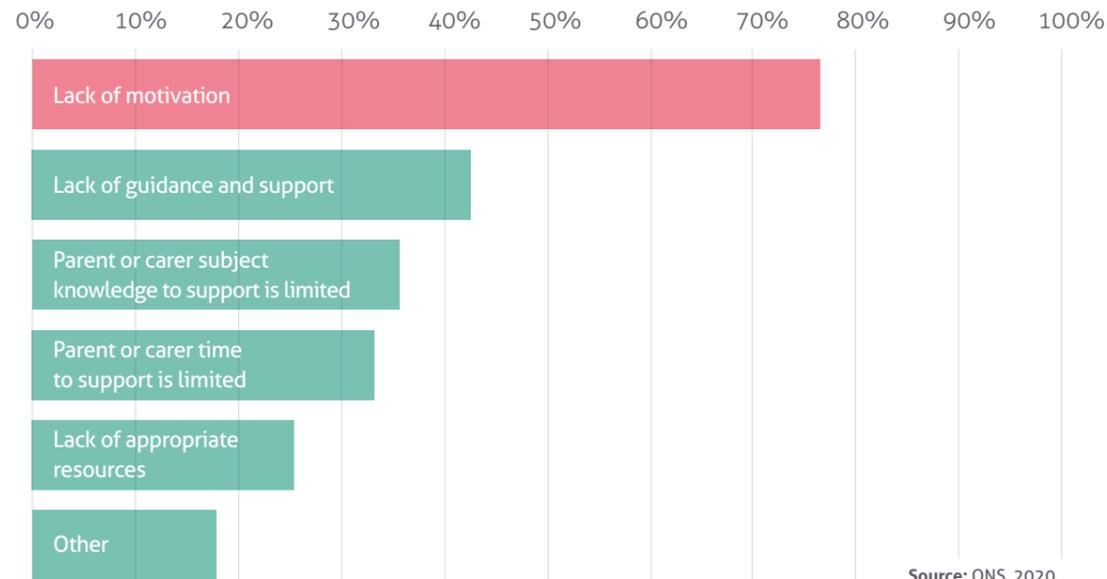
Parent Voice in the UK:
Why is Remote Learning Difficult for Students?

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |

Lack of motivation

Lack of guidance and support

Parent or carer subject knowledge to support is limited

Parent or carer time to support is limited

Lack of appropriate resources

Other

Source: ONS, 2020.

This is a problem that predates the COVID-19 pandemic. In the US, before the lockdown, approximately 29% of student reported that they were "not engaged" and 24% reported being "actively disengaged" (Hodges, 2018). But it is getting worse. At the beginning of May, over 80% of teachers said that student motivation was lower than it had been pre-lockdown (EdWeek, 2020). As home and blended learning contexts become normalised, educators need to equip themselves to face the motivation challenge.

Student motivation should be at the forefront of educators' strategic planning for the years ahead, particularly as they assess their options for investing in edtech solutions.

Motivation in the UK: Ross McGill @teachertoolkit
"I can only speak from my experience as a parent. Motivation [was] definitely impacted by a lack of school and routine. Boredom, energy levels dropped as result of monotonous day-to-day life. I suspect that the initial excitement of 'home-schooling' dissipated after 3 or 4 weeks".

5

The link between student wellbeing and motivation

For the majority of students, school closures have negatively impacted mental wellbeing. Feelings of loneliness are widespread, particularly for older students. These findings are strongly associated with student motivation.

Original research conducted by ImpactEd with over 11,000 students suggests that poorer students in the UK have been unhappier during lockdown than their wealthier peers. This research also shows that lockdown has had a bigger impact on girls. We find wellbeing scores for girls to be a full 5% lower than boys. With surveys being conducted every fortnight, these trends have remained relatively consistent over the course of lockdown (ImpactEd, 2020).

As part of this series of surveys, participants were asked if they felt useful and how much they could keep on going when they encountered challenges. Responses to these questions were consistently associated with wellbeing scores – those who were more motivated reported higher wellbeing, and those who were less motivated, showed lower wellbeing (ImpactEd, 2020).

Student wellbeing in the US and Australia
In the US, parents of K–12 students are significantly concerned about the mental health of young people. In a survey of over a 1,000 parents of K–12 students, 89% reported that school disruptions added to overall stress and anxiety among young people. A further 56% said that their own child had felt anxious or depressed.

In Australia, 56% of teachers identified their student's social isolation as a top concern, with 54% specifying a decrease in student well-being.

Sources: Pearson, 2020; Grattan Institute, 2020.

Australia and New Zealand:
Top Teacher Concerns about Students

	Aus	NZL
Social Isolation	56%	49%
A decrease in student well-being	54%	46%
Learning loss	46%	47%
Lack of access to technology/internet	37%	43%
Lack of support form a parent or guardian	36%	33%
Disruption in meeting learning targets	31%	21%
Lack of access to basic needs	13%	20%

Source: Flack, 2020.

The evidence on wellbeing is worrying for two reasons. Lower levels of wellbeing are in themselves a significant issue during a time of increasing concern about student mental health. But our findings also suggest that lower wellbeing is associated with reductions in academic motivation and therefore educational engagement and attainment.

6

Helping teachers to help students

The evidence suggests that the more school systems can support teachers, the better the results for student motivation and attainment. We estimate that 60-65% of teachers have seen an increase in working hours as a result of the pandemic.

The pandemic has not only affected students. Inflexible school systems mean teachers have experienced exponential workload increases, with more time spent on planning and managing complex blended working loads. Research in the UK found half of teachers reported increases in workload (Chartered College of Teaching, 2020).

The Grattan Institute in Australia found 74% of teachers reported an overall increase in working hours. More than 90% of teachers (out of 3,556 respondents) reported significant increases in demands on their time under remote learning. 70% of teachers said planning time had increased either "slightly" or "significantly." (Grattan Institute, 2020)

Remote Learning in Australia: Kate Salmon (Learning and Teaching Consultant, Catholic Schools Lismore):
"We have reimagined the way that we deliver and facilitate professional learning as a school system. Almost 100% of our meetings and professional learning workshops and events are delivered in a blended format with teachers either engaged in a combination of synchronous and asynchronous learning, or in a completely self-paced online environment. This has caused us to think deeply about how we collect evidence of learning with teachers and how we measure the impact of professional learning and this is changing our practice for the better."

As well as workload challenges, the teacher-student relationship can be harder to sustain in changing learning contexts. One principal in the UK told us that "I have lost the motivating reward of interacting with young people and watching their successes each day".

A rich range of evidence demonstrates that teacher burnout is significantly associated with weakened motivation in students. As a result, school leaders and educators should consider the link between teacher wellbeing and student motivation as a core part of their edtech strategy.

Section 1: Conclusion
From the evidence presented in Section 1 it is clear that technology has an important role to play in the delivery of remote or blended learning, and the best edtech tools will address the key challenges of these environments - namely student motivation, wellbeing, and teacher workload.

As educators increasingly look to technology to support their practice, they should prioritise solutions that are proven to drive student motivation.

Ideally these solutions should also address teacher workload and student wellbeing. The evidence shows that the COVID 19 crisis has led to particularly acute challenges in all three of these areas. But it also shows that these problems pre-date the immediate crisis and will need to be addressed long after the pandemic ends.

Section 2
How technology can support educators to improve student motivation and attainment

We have identified sustaining student motivation as a significant challenge during this period of change. As educators look to edtech to help them address this challenge across blended, remote and in-school learning contexts, we argue that it is crucial that they base their decisions on solid research evidence. Otherwise, they will not be able to use edtech and its potential to address the educational challenges of the past.

This section brings together evidence on motivation to suggest how educators might enhance and sustain motivation and ultimately improve achievement through the use of education technology.

In this section, we will explore the following themes:

1 / **Understanding motivation as a key driver of student success**

2 / **Enhancing and sustaining student motivation**

3 / **The promise of online tools to support student motivation**

4 / **The links between effective feedback and student motivation**

5 / **Domain specific interventions: How to improve motivation to write**

1

Understanding motivation as a key driver of student success

We know motivation is complex. We also know that motivation has a direct effect on student attainment.

The research evidence suggests that learning is most productive when students are more intrinsically motivated – when they are motivated by their interest in learning and the nature of the topic, not for the purposes of a reward.

Educational researchers suggest we can enhance intrinsic motivation by meeting students' needs for **autonomy** (believing they can manage their own actions), **competence** (believing they are capable) and **relatedness** (developing secure and connected relationships with their peers and teachers). As such, educators should consider carefully how the technology they introduce helps to develop those competencies.

Student Motivation in the UK
In the UK more motivated young people outperform their peers by 0.36 standard deviations (about half a GCSE grade) on exams at age 16. International research shows a clear positive correlation between students' perceptions of their ability to achieve goals and their readiness to cope with challenges in blended learning environments.

Source: Zilka et al., 2019.

2

Enhancing and sustaining student motivation

The potential of better developing student motivation is significant, particularly in relation to coping with a changing learning landscape.

Following what we know about motivational processes, and a detailed literature review, evidence-based recommendations are made on the key factors that educators should consider when planning how to develop and sustain student motivation.

Research Summary: What does 'good' look like?

We conducted a literature review to see how educators have taken these academic ideas about motivation and designed successful interventions to support students.

Successful interventions and programmes:
▶ Create choice for students
▶ Provide opportunities for giving positive feedback on accomplishments
▶ Create forums for students to relate and belong to each other, their teachers and their school

If implemented well, digital technologies are well-placed to create these conditions.

	Building autonomy through choice		**Building competence through successes**		**Building relatedness through grouping**
All choice	Choice of every kind provides opportunity to experience autonomy (Patall et Al, 2008)	**All tasks**	All past successes increase student's belief they will succeed again in future, including completion of facile tasks. (Yoshida, 2008)	**Learning together**	Cooperative learning where students work together to achieve a common goal supports students' need for belonging (Sharan, 2010)
Types of choice	Four types of student choice (curriculum, group work, assignment and, assessment) strategies can enhance autonomy (Birdsell, 2009)	**Types of task**	Only successes that represent mastery improve self-efficacy (Erikson, 1968/1994)	**Classroom community**	Building a classroom community so students have a strong sense of belonging to their institution, teachers and peer groups. (Booker, 2016)
Negative impact	Some evidence suggests students deciding how fast to progress through course content and whether the progression is linear or iterative have a negative effect on achievement (Bernard, 2019)	**Feedback and Persuasion**	Timely feedback and praise for specific task accomplishments fosters perceived sense of competence (Nikou, 2018). Well timed messages persuading students of their capacity for success encourages high-self-efficacy. Deci, E & Ryan, R. (2003)	**Assessment**	Embedding collaboration into assessment can lead to social interactions and a sense of belonging (Thomas et Al 2014)

Source: ImpactEd, 2020.

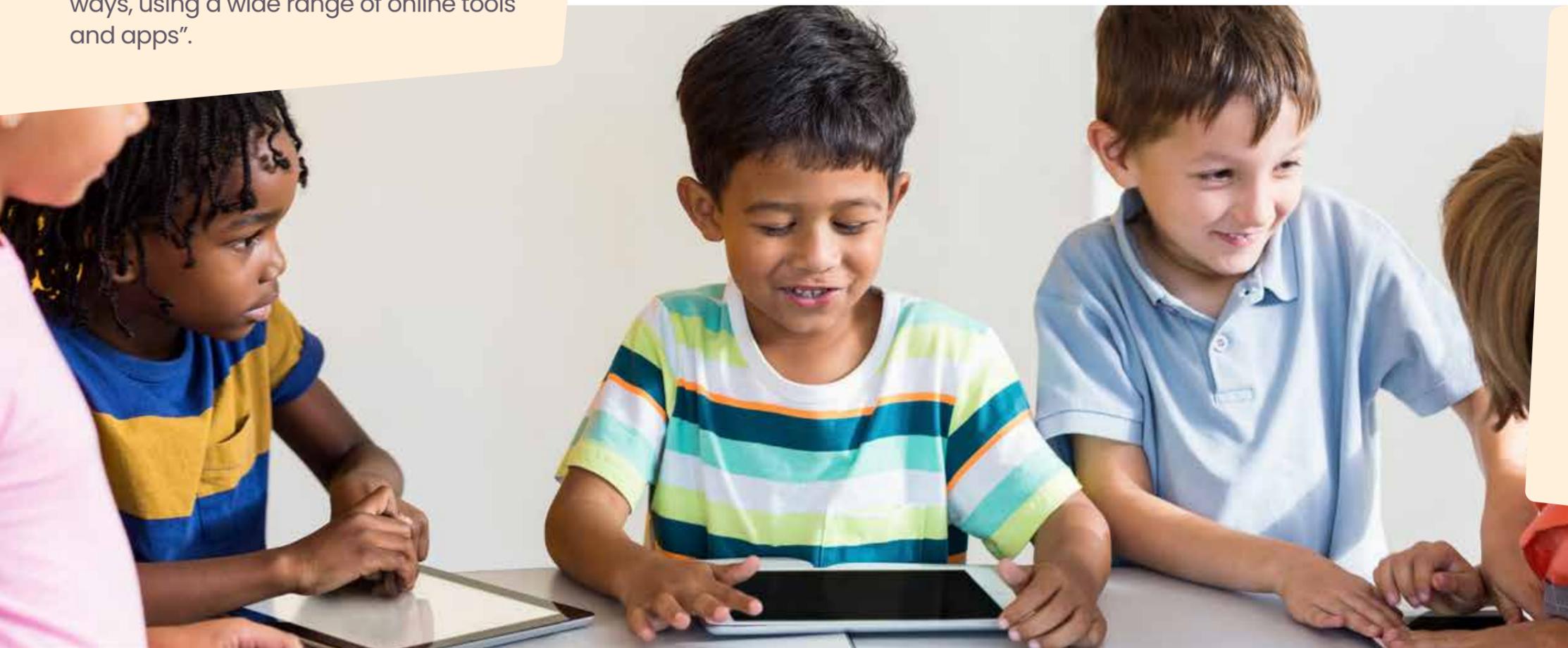## 3 The promise of online tools to support student motivation

There is significant potential to better develop and sustain motivation for students in blended learning environments.

The Promise of Edtech in Lockdown: Philip Hedger (CEO, LEO Academy Trust)
"Children have had the opportunity to take genuine ownership of their learning, responding to the same task in different ways, using a wide range of online tools and apps".

When executed effectively, the research shows that edtech can improve student outcomes. For example, in a study across grades 1-8 in the US, a technology-supported learning environment (e.g. introducing tools such as student response systems, iPads and computer software), improved student motivation and engagement by 9%. (Godzicki et al., 2013). Building on this, micro-learning and gamification are two strategies that educators can deploy.

Research into micro-learning (this means small learning units and activities, such as definitions, formulas, small paragraphs, and flash cards with micro-assessment) has shown that these approaches can better engage students in online and blended learning, leading to higher-levels of satisfaction and achievement.

Evidence in Context: A Micro-Study on Micro-Learning
In a study of a senior-level high school in Europe, researchers looked at the effect of a series of mobile-based micro-learning and assessment homework activities on students' motivation and learning performance in science.

Each homework assignment consisted of a series of 15 mini units, each one followed by a true/false or multiple choice type question with feedback and an extra collaborative task. Over a period of 5 weeks it was found that, in comparison to a control group, students in the experimental group reported significantly higher perceived autonomy and competence, and higher levels of learner satisfaction and achievement.

Source: Nikou, 2018.

Similarly, when platforms and products are designed appropriately, gamification can also help drive student motivation, although typically by offering external reward (extrinsic). This is an emerging field with the majority of studies (64%) into gamification's impact still inconclusive (Dichev, 2016). But there are some grounds for optimism:

Further research shows that gamification can be used as a motivating strategy. For example, game mechanics such as point systems and leadership boards can lead to significantly higher engagement.

Gamification and Academic Performance: Grounds for Optimism
In June this year, a meta-analysis of 30 independent interventions (3,202 participants) drawn from 24 quantitative studies that examined the impact of gamification on academic performance in various educational settings was published. The results show a statistically significant effect size in favour of gamification over learning without gamification.

Source: Bai et al., 2020.

4

The links between effective feedback and student motivation

In particular, research suggests that the use of technology to deliver frequent and immediate feedback can be motivating, especially where it does not overburden instructors or frustrate students.

Research into feedback suggests students can be motivated more directly with specific approaches to providing feedback. The research suggests that technology offers a unique opportunity to provide immediate feedback which acts as a strong motivator for students.

Recent evidence shows that anticipation of feedback affects emotions, which in turn, impacts student performance. Students who are told to expect feedback experience more joy and less anger (Pekrun et al., 2014).

Timely and bite-sized feedback helps students to feel successful as they learn, helping to sustain motivation. However, there can also be teacher workload challenges in delivering frequent and high-quality feedback. As such, we argue that utilizing technology to support teachers to better deliver feedback should be a priority for education leaders grappling with the potential trade-offs between student motivation and teacher workload.

Technology and Feedback

"Technology for feedback may collapse space and time; learners and instructors perceive that they are closer. Immediate feedback is a strong motivator for learners and an important part of the learning process as it helps focus learners' efforts"

Source: Costello and Crane, 2013.

5

Domain specific interventions – How to improve motivation to write

The evidence suggests that edtech tools that drive motivation should be 'domain specific', focusing on a particular subject area. Reading and Maths are often the key areas of focus, however achievement gaps in writing are also a particular challenge for educators. In this section we explore how edtech might support writing attainment in the context of student motivation.

We know that motivation is domain and task specific. In other words, how motivated you are and the relation this has to your academic achievement can change depending on the subject area of the task (you can be motivated to do a maths problem set, but not motivated to write paragraphs).

Given the scale of achievement gaps in writing, it is important to look at solutions that address this particular problem. In the US fewer than 30% of fourth- eighth-, and twelfth grade students write at the proficient level and only half of the US population is prepared for college-level writing (Barett et al., 2020). In a recent report into writing in the state of New South Wales in Australia, researchers found that the situation was worsening: Year 9 students in 2019 were the equivalent of five months behind the level of Year 9 students in 2011 (Baker, 2020).

Research shows that motivating students to write more, and to do so in longer bursts of time, improves writing fluency. Performance feedback, such as commenting on the number of words written compared to previous writing, can help students to write more. Technology tools automating performance feedback offer teachers an opportunity to improve student writing fluency and save valuable teacher time.

What does the research on writing fluency show?
Cognitive research on writing has shown that proficient writers produce text fluently in relatively long chunks and bursts. They also spend more time planning, generating text and reviewing, and tend to pause at natural planning junctures like clause and sentence boundaries.

Researchers have found that time on task and burst length (an index of the ability to generate uninterrupted strings of text) has consistent positive correlations with holistic essay scores. And, that the more efficient a student is at transcription, the higher the quality of the writing product.

For improving writing, a randomised controlled trial with 133 third-grade students in the US found that brief feedback on the number of words written increased writing fluency: performance feedback was effective in increasing total words written by "an average of almost 10 words more" when compared to control groups. Total words written and the number of correct writing sequences were also "very highly correlated", suggesting that targeting the quantity of writing may also improve the quality of writing. Students in the performance feedback group improved their total words written 3.6 times faster than the average rate of improvement for students in late elementary grades, and the number of correct writing sequences 2.5 times faster.

Sources: Deane and Zang, 2015; Barrett et al., 2020.

Section 2: Conclusion
From the evidence presented in Section 2, it is clear that educators should select digital solutions that are rooted in the academic evidence, rather than short-term responses to COVID-19. These will likely include features that encourage students to work hard, offer instant feedback, create opportunities to engage in a community of learners and provide them with autonomy.

Edtech in the US: Amy Mayer (CEO, friED Technology)
"My greatest hope is that we've learned that technology is a powerful tool for communication and that we can all leverage it much more effectively than we originally realised."

Conclusion

The COVID-19 pandemic has led to unprecedented change in the education systems of all three regions we studied. The use of technology has been pushed into the mainstream more quickly than anyone ever could have expected. Edtech is likely to become the vehicle for students to continue to learn and develop despite the huge disruption caused by the pandemic.

This paper shows how lockdowns in each country have created a range of new challenges for educators, but also deepened existing long-term problems and inequalities in education systems.

The analysis presented in this paper suggests that, as educators increasingly look to technology to support their practice, they should prioritise evidence-based solutions that drive student motivation.

There are three reasons for this:

1   **First, there is a strong research base linking motivation and attainment.**

2   **Second, student motivation has been adversely affected by lockdowns.**

3   **Third, student motivation will continue to be an issue for schools long after the pandemic dissipates.**

Ideally, these solutions should be chosen based on their ability to address teacher workload and student wellbeing.

The evidence shows that the COVID-19 crisis has led to particularly acute challenges in these three linked areas (student motivation, teacher workload, student wellbeing). But it also shows that they pre-date the immediate crisis and will need to be addressed long after the pandemic dissipates.

Educators interested in improving student motivation can draw on a solid research base to suggest how programmes and interventions can build student motivation.

► They should be deliberate about what they are trying to improve motivation for (techniques for improving motivation to write are fundamentally different from improving motivation to complete maths problems).
► They should prioritise the delivery of feedback for students.
► They should create opportunities to engage in a community of learners and provide students with autonomy.

Methodology

The paper draws on both original research conducted by ImpactEd in the UK from May to July 2020, and a synthesis of existing evidence on COVID-19 impacts and student motivation.

Original data was collected as part of ImpactEd's longitudinal research project, 'Lockdown lessons: student learning and wellbeing during the COVID-19 pandemic'. Through a series of fortnightly surveys focusing on student wellbeing, learning and persistence, we were able to reach more than 11,000 young people in the UK to understand how lockdown had affected their engagement with education.

As well as this survey data, we were able to supplement the dataset through triangulating results against:

▶ Data on demographic characteristics (free school meal status, gender, English as an additional language, geographical location and other factors) and school-level data on academic performance.
▶ A quantitative and qualitative survey being administered to a sample of teachers and school leaders within the study, to assess relationships between staff behaviours and student outcomes.
▶ Interviews and focus groups with senior school staff to cast further insight into the stories behind the findings.

The full report covers both published data from the project so far and previously unpublished findings which we will continue to share over the coming weeks.

Our second source of data was to review and synthesise existing evidence, covering both academic material and grey literature to achieve a global perspective on:

▶ The impact of COVID-19 as a whole, and how this has varied across North America, Australia and the United Kingdom. Our secondary analysis of contemporary surveys and research supports original insights on COVID-19 related challenges.
▶ The underpinning science behind student motivation, and how this might be sustained in remote and blended learning environments. Our literature review of established educational research on motivation offers solid evidence for claims about the potential of technology solutions to enhance motivation and improve achievement.

In both evidence reviews, we primarily focused on material with:

▶ Large sample sizes or discussing interventions which had been replicated across multiple contexts
▶ Recent publication dates, particularly where focusing on the changing dynamic of technology
▶ That was relevant to our three main geographical focuses of North America, Australia and the United Kingdom

The use of original fieldwork and a synthesis of existing evidence has enabled us to gain unique insights into some of the factors affecting learning during these changing times, while testing those against the science of what we know about how children are motivated to learn.

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Our vision is to see a world where difference, disability or language are no longer barriers. This is what drives us to help unlock everyone's potential through innovative technology.

Founded in 1996, Texthelp has been at the forefront of assistive technology over the last three decades. With over 30 million users worldwide, our innovative suite of products include Read&Write, EquatiO®, WriQ®, Fluency Tutor®, Browsealoud® and Speechstream® which work alongside existing tools such as Microsoft Office and G-suite, enabling them to be integrated quickly into any classroom or workplace with ease.

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Texthelp employs over 180 staff across its headquarters in Belfast, UK and has offices in Boston, USA and Brisbane, Australia. It is backed by LDC, the private equity arm of Lloyds Banking Group.

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About ImpactEd

ImpactEd is a non-profit organisation that exists to improve student outcomes by addressing the evaluation deficit in education. We work in partnership with school leaders and education organisations to support high-quality monitoring and evaluation that informs decisions about what will work most effectively to support young people.

ImpactEd is a winner of the 2018 Teach First Innovation Award, partners with organisations such as United Learning, the Young Foundation, Nesta and Challenge Partners, and was chosen as a finalist for 'Supplier of the Year' in the 2019 Education Resources Awards. In the UK, ImpactEd's work has been profiled in Department for Education case studies on excellent evaluation practice.

ImpactEd is running the largest student-facing research study in the UK on the educational impact of Covid-19 on both learning and mental wellbeing, reaching over 50,000 pupils. This research has contributed directly to the findings outlined in this report. You can view emerging insights from this research at www. impacted.org.uk/covid-19.

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